

# V5-1.5W Series

## 1.5W Regulated Single & Dual output

### Features

- Regulated 24 Pin DIL Package
- Full SMD Technology
- 1000 VDC Isolation, Up to 6000 VDC(Metal Case Up To 3000Vdc)
- Continuous Short Circuit Protection
- Efficiency up to 79%
- -40 ~ 85°C Operation Temperature Range
- Plastic Case Standard, Optional Metal Case



The V5 series is a family of cost effective 1.5W single & dual output DC-DC converters. These converters combine miniature package in a 24-pin DIL compatible case with high performance features such as 1000VDC~6000 VDC input/output isolation voltage, continuous short circuit protection with automatic restart and tight line / load regulation. Devices are encapsulated using flame retardant resin. Input voltages of 5, 12, 24 with output voltage of 3.3, 5, 7.2, 9, 12, 15, 18, 24,  $\pm 3.3$ ,  $\pm 5$ ,  $\pm 7.2$ ,  $\pm 9$ ,  $\pm 12$ ,  $\pm 15$ ,  $\pm 18$  and  $\pm 24$  Vdc. High performance features include high efficiency operation up to 79% and output voltage accuracy of  $\pm 2\%$  maximum. Standard features include an input range of  $\pm 10\%$  tolerance and low output noise and ripple.

All specifications typical at  $T_a=25^\circ\text{C}$ , nominal input voltage and full load unless otherwise specified

OUTPUT SPECIFICATIONS	
Voltage accuracy	$\pm 2\%$
Line regulation	Single & Dual: $\pm 0.5\%$ , max
Load regulation	Single ( 0% to 100% ): $\pm 0.5\%$ , max Dual ( 0% to 100% ): $\pm 0.5\%$ , max (balanced load) Single & Dual (Output 3.3V Model): $\pm 1.0\%$ , max
Ripple & noise (20 MHz bandwidth)(1)	75mV pk-pk, max
Short Circuit Protection	Indefinite (Automatic Recovery)
Temperature coefficient	$\pm 0.02\%/^\circ\text{C}$
Capacitor load(2)	See table
Transient Recovery Time(3)	$\pm 3\%$ , max.
Transient Response	(3.3V Output $\pm 5\%$ , max.)

INPUT SPECIFICATIONS	
Voltage Range	$\pm 10\%$
Max. Input Current	See table
No-Load Input Current	See table
Input Filter	PI type
Input Reflected Ripple Current(4)	35mA pk-pk

GENERAL SPECIFICATIONS	
Efficiency	See table
I/O Isolation Voltage(3 sec)	
Input/Output	1000~6000Vdc
Metal Case/Input&Output	1000Vdc
I/O Isolation Capacitance	60 pF Typ.
I/O Isolation Resistance	1000M Ohm
Switching Frequency	Single 40kHz typ Dual 350kHz typ
Humidity	95% rel H
Reliability Calculated MTBF(MIL-HDBK-217 F)	>1Mhrs
Safety Standard : ( designed to meet )	IEC 60950-1

PHYSICAL SPECIFICATIONS	
Case Material	Non-conductive Black Plastic(UL94V-0 rated) Nickel-coated Copper
Base Material	Non-conductive Black Plastic(UL94V-0 rated)
Pin Material	0.5mm Alloy42 Solder-coated $\varnothing 0.5\text{mm}$ Brass Solder-coated
Potting Material	Epoxy (UL94V-0 rated)
Weight	12.5g(Plastic Case)/15.0g(Metal Case)
Dimensions	1.25"x0.8"x0.4"

ENVIRONMENT SPECIFICATIONS	
Operating Temperature	$-40^\circ\text{C} \sim 85^\circ\text{C}$ (See Derating Curve)
Maximum Case Temperature	100°C
Storage Temperature	$-40^\circ\text{C} \sim 125^\circ\text{C}$
Cooling	Nature Convection

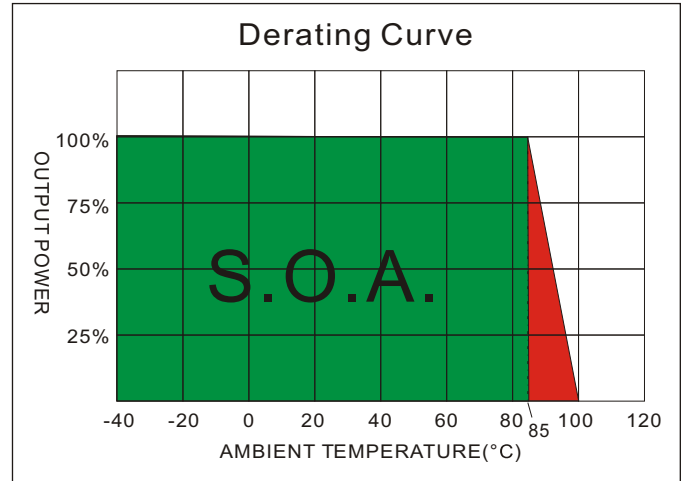
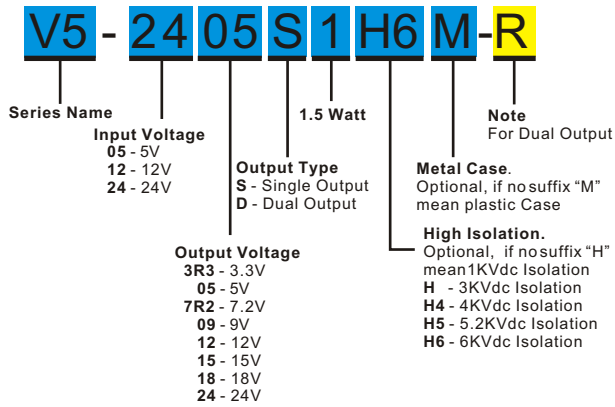
ABSOLUTE MAXIMUM RATINGS(5)	
These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.	
Input Surge Voltage(100mS)	
5 Models	7 Vdc ,max.
12 Models	15 Vdc ,max.
24 Models	28 Vdc ,max.
Soldering Temperature (1.5mm from case 10sec. max.)	260°C ,max.

EMC SPECIFICATIONS		
Radiated Emissions	EN55022	CLASS A
Conducted Emissions (7)	EN55022	CLASS A
ESD	IEC 61000-4-2	Perf. Criteria A
RS	IEC 61000-4-3	Perf. Criteria A
EFT (8)	IEC 61000-4-4	Perf. Criteria A
Surge (8)	IEC 61000-4-5	Perf. Criteria A
CS	IEC 61000-4-6	Perf. Criteria A
PFMF	IEC 61000-4-8	Perf. Criteria A

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## V5 - 1.5W Regulated Single & Dual output

### PART NUMBER STRUCTURE



## MODEL SELECTION GUIDE

MODEL NUMBER	INPUT Voltage Range (Vdc)	INPUT Current		OUTPUT Voltage (Vdc)	OUTPUT Current Full load (mA)	EFFICIENCY @FL(%)	Capacitor Load(uF)
		No-Load (mA)	Full Load (mA)				
V5-053R3S 1	5	50	426	3.3	400	62	220
V5-0505S 1	5	42	448	5	300	67	220
V5-057R2S 1	5	50	462	7.2	208	65	220
V5-0509S 1	5	65	462	9	167	65	220
V5-0512S 1	5	50	429	12	125	70	220
V5-0515S 1	5	65	441	15	100	68	220
V5-0518S 1	5	60	448	18	83	67	220
V5-0524S 1	5	60	448	24	63	67	220
V5-123R3S 1	12	50	177	3.3	400	62	220
V5-1205S 1	12	25	187	5	300	67	220
V5-127R2S 1	12	50	189	7.2	208	66	220
V5-1209S 1	12	40	192	9	167	65	220
V5-1212S 1	12	26	179	12	125	70	220
V5-1215S 1	12	40	195	15	100	64	220
V5-1218S 1	12	45	198	18	83	63	220
V5-1224S 1	12	40	202	24	63	62	220
V5-243R3S 1	24	35	104	3.3	400	53	220
V5-2405S 1	24	20	98	5	300	64	220
V5-247R2S 1	24	35	98	7.2	208	64	220
V5-2409S 1	24	35	98	9	167	64	220
V5-2412S 1	24	16	93	12	125	67	220
V5-2415S 1	24	40	95	15	100	66	220
V5-2418S 1	24	40	96	18	83	65	220
V5-2424S 1	24	40	96	24	63	65	220
V5-053R3D 1-R	5	15	377	±3.3	±200	70	±1000
V5-0505D 1-R	5	40	417	±5	±150	72	±470
V5-057R2D 1-R	5	35	429	±7.2	±208	70	±470
V5-0509D 1-R	5	20	429	±9	±83	70	±470
V5-0512D 1-R	5	25	423	±12	±63	71	±470
V5-0515D 1-R	5	30	423	±15	±50	71	±470
V5-0518D 1-R	5	30	429	±18	±83	70	±220

Suffix "H" means 3KVdc isolation      Suffix "H4" means 4KVdc isolation      Suffix "H5" means 5.2KVdc isolation      Suffix "H6" means 6KVdc isolation  
**Suffix "M" means Metal Case Up To 3KVdc isolation**

The models listed above is just for standard type. If you need the special specification product, please contact our service member by telephone presented in shortform cover or e-mail to : sales@motien.com.tw

## V5 - 1.5W Regulated Single & Dual output

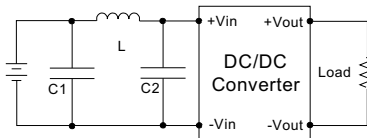
MODEL NUMBER	INPUT Voltage Range (Vdc)	INPUT Current		OUTPUT Voltage (Vdc)	OUTPUT Current		EFFICIENCY @FL(%)	Capacitor Load( uF)
		No-Load (mA)	Full Load (mA)		Full load (mA)			
V5-0524D 1-R	5	35	435	±24	±31.5	69	±220	
V5-123R3D 1-R	12	15	147	±3.3	±200	75	±1000	
V5-1205D 1-R	12	6	162	±5	±150	77	±470	
V5-127R2D 1-R	12	8	167	±7.2	±208	75	±470	
V5-1209D 1-R	12	10	158	±9	±83	79	±470	
V5-1212D 1-R	12	24	164	±12	±63	76	±470	
V5-1215D 1-R	12	20	169	±15	±50	74	±470	
V5-12 18D1-R	12	20	169	±18	±83	74	±220	
V5-1224D 1-R	12	20	164	±24	±31.5	76	±220	
V5-243R3D 1-R	24	8	76	±3.3	±200	72	±1000	
V5-2405D 1-R	24	5	83	±5	±150	75	±470	
V5-247R2D 1-R	24	8	83	±7.2	±208	75	±470	
V5-2409D 1-R	24	10	82	±9	±83	76	±470	
V5-2412D 1-R	24	10	81	±12	±63	77	±470	
V5-2415D 1-R	24	10	82	±15	±50	76	±470	
V5-24 18D1-R	24	13	89	±18	±83	70	±220	
V5-2424D 1-R	24	16	87	±24	±31.5	72	±220	

Suffix "H" means 3KVdc isolation      Suffix "H4" means 4KVdc isolation      Suffix "H5" means 5.2KVdc isolation      Suffix "H6" means 6KVdc isolation  
**Suffix "M" means Metal Case Up To 3KVdc isolation**

### TEST CONFIGURATIONS

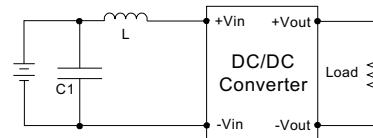
#### EMI Filter

Input filter components (C1,C2, L) are used to help meet conducted emissions requirement for the module. These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.



	C1	L	C2
V5-05XXXXX	220uF/100V	12uH	220uF/100V
V5-12XXXXX	220uF/100V	12uH	220uF/100V
V5-24XXXXX	220uF/100V	12uH	220uF/100V

Single Output



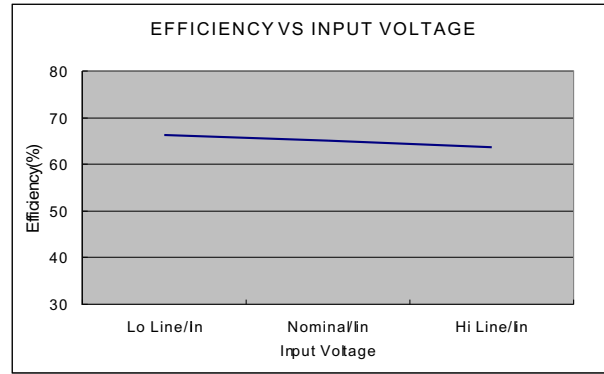
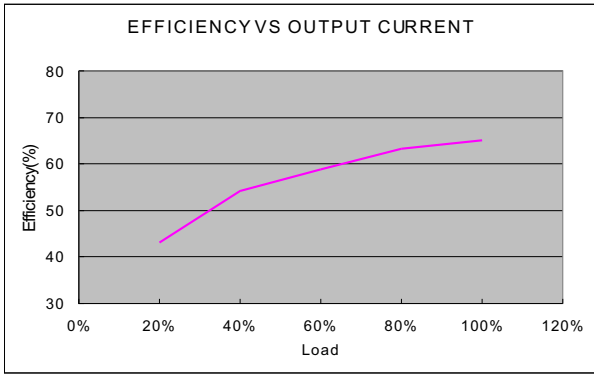
	C1	L
V5-05XXXXX	220uF/100V	12uH
V5-12XXXXX	220uF/100V	12uH
V5-24XXXXX	220uF/100V	12uH

Dual Output

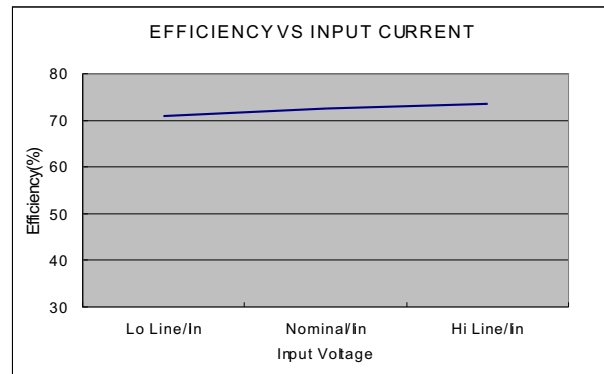
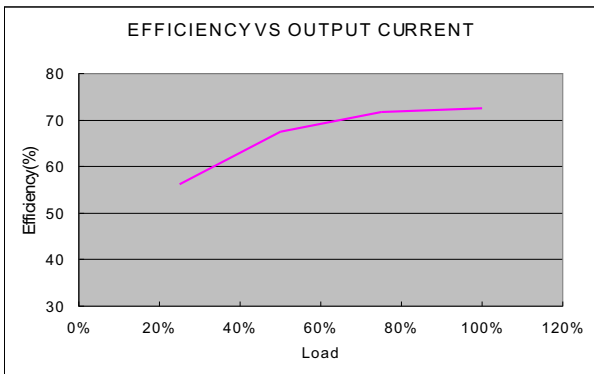
### NOTE

1. Ripple/Noise measured with 20MHz bandwidth.
2. Tested by minimal Vin and constant resistive load.
3. Tested by normal Vin and 25% load step change ( 75%-50%-25% of Io )
4. Measured Input reflected ripple current with a simulated source inductance of 12uH.
5. Exceeding the absolute ratings of the unit could cause damage. It is not allowed for continuous operating.
6. Operation under no-load conditions will not damage these devices, however they may not meet all listed specifications.
7. Input filter components are required to help meet conducted emission class A, which application refers to the EMI Filter of design & feature configuration.
8. An external filter capacitor is required if the module has to meet IEC61000-4-4 and IEC61000-4-5.

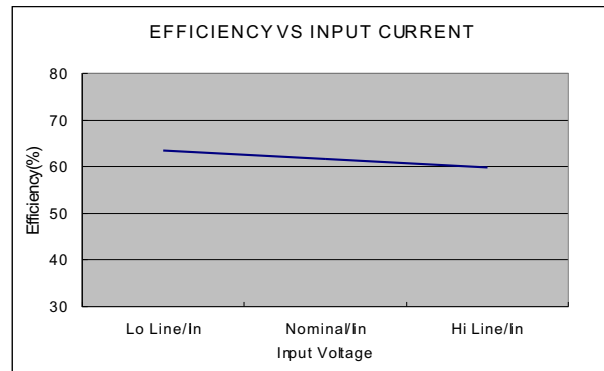
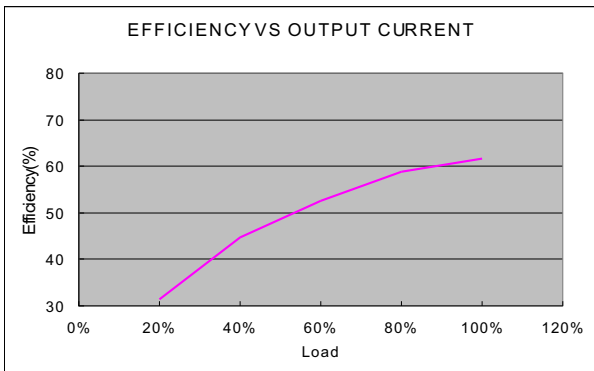
The filter capacitor Motien suggest: Nippon - chemi - con KY series, 220uF/100V.



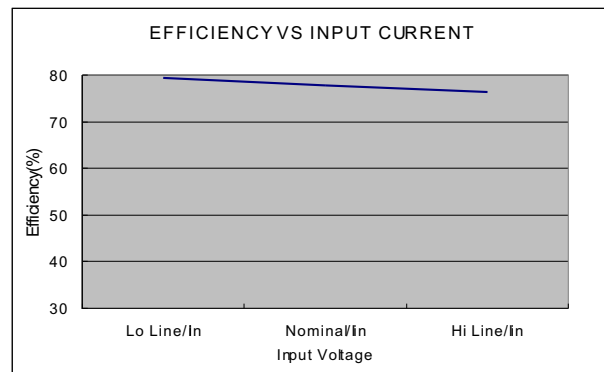
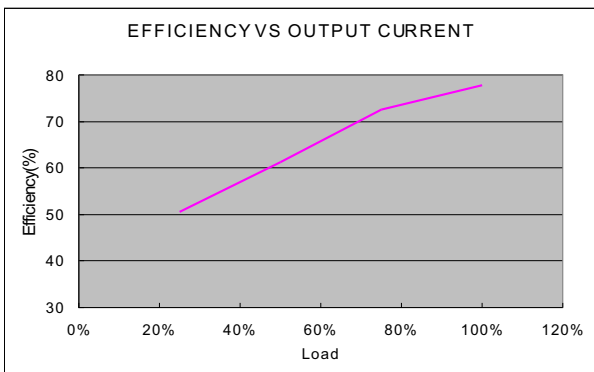
05 Single Output Models



05 Dual Output Models

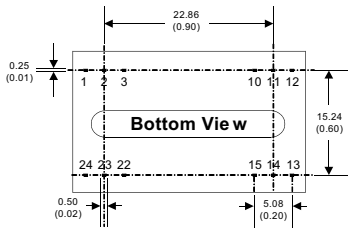
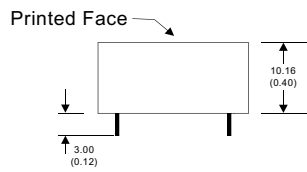
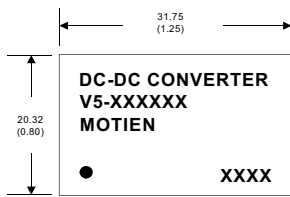


24 Single Output Models



24 Dual Output Models

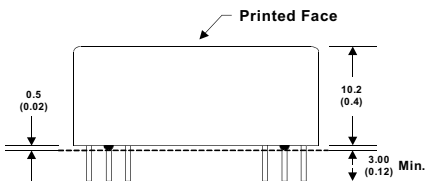
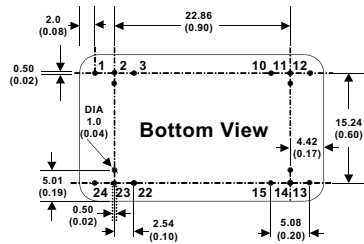
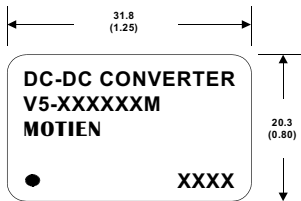
**MECHANICAL SPECIFICATIONS**



**24 Pin DIL Package  
Non-Conductive Plastic**

Notes : All dimensions are typical in millimeters ( inches ).  
 1. Pin diameter: 0.5±0.05 ( 0.02±0.002 )  
 2. Pin pitch and length tolerance: ±0.35 ( ±0.014 )  
 3. Case Tolerance: ±0.5 ( ±0.02 )

PIN CONNECTIONS				
PIN NUMBER	SINGLE	DUAL	SINGLE-H	DUAL-H
1	+V Input	+V Input	+V Input	+V Input
2	N.C.	-V Output	+V Input	+V Input
3	N.C.	Common	N.P.	N.P.
10	-V Output	Common	N.P.	Common
11	+V Output	+V Output	N.P.	Common
12	-V Input	-V Input	-V Output	N.P.
13	-V Input	-V Input	+V Output	-V Output
14	+V Output	+V Output	N.P.	N.P.
15	-V Output	Common	N.P.	+V Output
22	N.C.	Common	N.P.	N.P.
23	N.C.	-V Output	-V Input	-V Input
24	+V Input	+V Input	-V Input	-V Input



**24 Pin DIL Package  
Nickel-Coated Copper**

Notes: All dimensions are typical in millimeters ( inches ).  
 1. Pin diameter: 0.5 ±0.05 ( 0.02 ±0.002 )  
 2. Pin pitch and length tolerance: ±0.35 ( ±0.014 )  
 3. Case Tolerance: ±0.5 ( ±0.02 )  
 4. Stand-off tolerance: ±0.1 ( ±0.004 )

For "M" Case

PIN CONNECTIONS				
PIN NUMBER	SINGLE	DUAL	SINGLE-H	DUAL-H
1	+V Input	+V Input	+V Input	+V Input
2	N.C.	-V Output	+V Input	+V Input
3	N.C.	Common	N.P.	N.P.
10	-V Output	Common	N.P.	Common
11	+V Output	+V Output	N.P.	Common
12	-V Input	-V Input	-V Output	N.P.
13	-V Input	-V Input	+V Output	-V Output
14	+V Output	+V Output	N.P.	N.P.
15	-V Output	Common	N.P.	+V Output
22	N.C.	Common	N.P.	N.P.
23	N.C.	-V Output	-V Input	-V Input
24	+V Input	+V Input	-V Input	-V Input